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10/533,226	04/07/2006	Paolo Fella	P/63773	7074

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EXAMINER	
DOBSON, DANIEL G	

ART UNIT	PAPER NUMBER
2613	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/533,226	FELLA ET AL.	
	Examiner	Art Unit	
	DANIEL G. DOBSON	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3.* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 January 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-40* is/are pending in the application.

4a) Of the above claim(s) *1-20* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *21-40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *01/28/2009*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 21 and 30 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 21, 30, 39, and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Printed Publication "Fibre Brillouin amplifiers" to Tkach et al. and U.S. Patent Application Publication 2003/01442395 A1 to MacCormack et al.

As to **Claim 21**, *Tkach* discloses an apparatus for controlling optical amplifier gain (Fig. 2, fibre Brillouin amplifier), comprising:

a) a source for generating a gain control signal (Fig. 2, pump input, gain of the amplifier is proportional to the pump power, p. 107, ¶ 1; thus the pump is a gain control signal);

b) an optical amplifier for receiving at least one optical input signal channel of optical input signal channels at a first end (Fig. 2, the fiber coils act as an amplifier, the amplifier receives at least one optical input signal from the left side);

c) a coupler for providing the gain control signal to the optical amplifier at a second end thereof (Fig. 2, at second end, the gain control signal (pump) is coupled via the 2X2 coupler); and

d) the source being arranged to generate the gain control signal at a power level that produces stimulated Brillouin scattering in the optical amplifier (the pump generates SBS in the amplifier (fiber coils) given by equation 1, p. 105.)

The gain control signal is about 11 GHz above (or .088 nm below) the signal, so *Tkach* does not expressly disclose that the gain control signal is at a higher wavelength than any of the optical input signal channels.

MacCormack discloses that if a pump laser is not controlled, its wavelength can vary 15nm to 21nm from its intended operating point. A 3 degree change would push the gain control signal wavelength above the wavelength of the optical input signal channel.

A person setting up the Brillouin amplifier disclosed by *Tkach* would accidentally or unintentionally set the gain control signal at a higher wavelength than any of the optical input signal channels if the pump laser was allowed to creep upwards only 0.09 nm. This would happen where an un-cooled pump laser was used for experimental purposes and the laboratory temperature changed or where a cooled laser was used and the controller was set-up improperly or malfunctioned. Also, consider the case where the system disclosed by *Tkach* was being set up. The pump laser wavelength (when turned

up) has to be either higher or lower than the wavelength of the signal channel. As likely as not it would be higher at turn-up, and would have to be tuned to the correct wavelength.

Tkach and *MacCormack* are from the same art with respect to optical communications and are therefore analogous art.

At the time of the invention, it would have been obvious for the gain control signal to be at a higher wavelength than any of the optical input signals channels, because a person of ordinary skill in the art operating the system disclosed by *Tkach* would have unintentionally done this while setting up the system or by not tightly controlling the pump laser.

As to **Claim 30**, *Tkach* discloses a method of controlling optical amplifier gain ((Fig. 2, fibre Brillouin amplifier), comprising the steps of:

a) introducing at least one of optical input signal channels into a first end of an optical amplifier (Fig. 2, the fiber coils act as an amplifier, the amplifier receives at least one optical input signal from the left side);

b) generating a gain control signal and introducing the gain control signal at a second end of the optical amplifier (Fig. 2, pump input at second end, gain of the amplifier is proportional to the pump power, p. 107, ¶ 1; thus the pump is a gain control signal); and

c) generating the gain control signal at a power level that produces stimulated Brillouin scattering in the optical amplifier (the pump generates SBS in the amplifier (fiber coils) given by equation 1, p. 105.)

The gain control signal is about 11 GHz above (or .088 nm below) the signal, so *Tkach* does not expressly disclose that the gain control signal is at a higher wavelength than any of the optical input signal channels.

MacCormack discloses that if a pump laser is not controlled, its wavelength can vary 15nm to 21nm from its intended operating point. A 3 degree change would push the gain control signal wavelength above the wavelength of the optical input signal channel.

A person setting up the Brillouin amplifier disclosed by *Tkach* would accidentally or unintentionally set the gain control signal at a higher wavelength than any of the optical input signal channels if the pump laser was allowed to creep upwards only 0.09 nm. This would happen where an un-cooled pump laser was used for experimental purposes and the laboratory temperature changed or where a cooled laser was used and the controller was set-up improperly or malfunctioned. Also, consider the case where the system disclosed by *Tkach* was being set up. The pump laser wavelength (when turned up) has to be either higher or lower than the wavelength of the signal channel. As likely as not it would be higher at turn-up, and would have to be tuned to the correct wavelength.

At the time of the invention, it would have been obvious for the gain control signal to be at a higher wavelength than any of the optical input signals channels, because a person of ordinary skill in the art operating the system

disclosed by *Tkach* would have unintentionally done this while setting up the system or by not tightly controlling the pump laser.

As to **Claim 39**, *MacCormack* discloses that if a pump laser is not controlled, its wavelength can vary 15nm to 21nm from its intended operating point. Therefore the gain control signal would be 10 to 15nm higher than any of the optical input channels. The suggestion/motivation is the same as that used in the rejection for claim 21.

As to **Claim 40**, *MacCormack* discloses that if a pump laser is not controlled, its wavelength can vary 15nm to 21nm from its intended operating point. Therefore the gain control signal would be 10 to 15nm higher than any of the optical input channels. The suggestion/motivation is the same as that used in the rejection for claim 30.

4. Claims 22, 23, 25, 27, 31, 32, 34, and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Printed Publication "Fibre Brillouin amplifiers" to Tkach et al. and U.S. Patent Application Publication 2003/01442395 A1 to MacCormack et al., as applied above, and further in view of U.S. Patent Application Publication 2002/0196527 A1 to Veith.

As to **Claim 22**, *Veith* discloses control means for identifying a change in an input signal and for varying the power level of the gain control signal to compensate for the identified change (¶¶ 39, 24-25, the intensity of the pump light is controlled via a closed loop control circuit to obtain the desired amplification.)

Veith is from the same art with respect to optical communications.

At the time of the invention, it would have been obvious for a person of ordinary skill in the art to use a control for the gain control signal (pump laser) disclosed by *Tkach*. The suggestion/motivation would have been to properly control the signal power level.

As to **Claim 23**, *Veith* discloses monitor means for monitoring a power of the input signal and for varying the power level of the gain control circuit to compensate for changes in the monitored power (¶¶ 39, 24-25, the intensity of the pump light is controlled via a closed loop control circuit to obtain the desired amplification.) The suggestion/motivation is the same as that used in the rejection for claim 22.

As to **Claim 25**, *Veith* discloses wherein the gain control signal (Fig. 6, P6) falls within the gain bandwidth of the optical amplifier (Fig. 6, CR, solid bold line.) The suggestion/motivation is the same as that used in the rejection for claim 22.

As to **Claim 27**, *Veith* discloses wherein the amplifier is a Raman amplifier (¶¶ 38-40.) The suggestion/motivation is the same as that used in the rejection for claim 22.

As to **Claim 31**, *Veith* discloses identifying a change in an input signal and for varying the power level of the gain control signal to compensate for the identified change (¶¶ 39, 24-25, the intensity of the pump light is controlled via a closed loop control circuit to obtain the desired amplification.)

At the time of the invention, it would have been obvious for a person of ordinary skill in the art to use a control for the gain control signal (pump laser) disclosed by *Tkach*. The suggestion/motivation would have been to properly control the signal power level.

As to **Claim 32**, *Veith* discloses monitoring a power of the input signal and for varying the power level of the gain control circuit to compensate for changes in the monitored power (¶¶ 39, 24-25, the intensity of the pump light is controlled via a closed loop control circuit to obtain the desired amplification.) The suggestion/motivation is the same as that used in the rejection for claim 31.

As to **Claim 34**, *Veith* discloses wherein the gain control signal (Fig. 6, P6) falls within the gain bandwidth of the optical amplifier (Fig. 6, CR, solid bold line.) The suggestion/motivation is the same as that used in the rejection for claim 31.

As to **Claim 36**, *Veith* discloses wherein the amplifier is a Raman amplifier (¶¶ 38-40.) The suggestion/motivation is the same as that used in the rejection for claim 31.

5. Claims 24, 26, 33 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Printed Publication “Fibre Brillouin amplifiers” to Tkach et al., U.S. Patent Application Publication 2003/01442395 A1 to MacCormack et al., and U.S. Patent Application Publication 2002/0196527 A1 to Veith., as above, and further in view of U.S. Patent 5,598,289 to Watanabe.

As to **Claims 24 and 33**, *Watanabe* discloses obtaining information at the at least one input signal channel from and optical supervisory channel (Col. 10, ll. 50-8.)

Watanabe and *Veith* are from the same art with respect to optical communications, and are therefore analogous art.

At the time of the invention, it would have been obvious for a person of ordinary skill in the art to use a supervisory channel to obtain information about input signal channels in the system disclosed by *Veith*. The suggestion/motivation would have been to quickly detect points of trouble or other interference in the transmission system.

As to **Claims 26 and 35**, *Watanabe* discloses means for monitoring the power level of the gain control signal (Fig. 28, 196, 199.)

At the time of the invention, it would have been obvious for a person of ordinary skill in the art to monitor the gain control signal (SBS injection light) in the system disclosed by *Veith*. The suggestion/motivation would have been to be able to quickly diagnose a failure by the pump.

6. Claims 28, 29, 37, and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Printed Publication "Fibre Brillouin amplifiers" to Tkach et al., U.S. Patent Application Publication 2003/01442395 A1 to MacCormack et al., and U.S. Patent Application Publication 2002/0196527 A1 to Veith., as above, and further in view of U.S. Patent 6,441,950 B1 to Chen et al.

As to **Claims 28, 29, 37 and 38**, *Chen* discloses that distributed Raman amplifiers and rare earth doped amplifiers are commonly used in communications systems (background and summary of the invention.)

Chen is from the same art with respect to optical communications, and is therefore analogous art.

At the time of the invention, it would have been obvious for a person of ordinary skill in the art to use a distributed Raman amplifier and/or a rare earth doped fiber amplifier in the system disclosed by *Veith*. The suggestion/motivation would have been to use available parts and well established technology.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DANIEL G. DOBSON whose telephone number is (571)272-9781. The examiner can normally be reached on Mon. - Fri. 8:00 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Vanderpuye can be reached on (571) 272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Daniel G. Dobson/
Examiner, Art Unit 2613
04/16/2009

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